

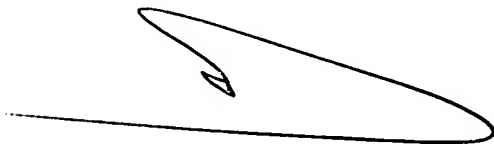
## **DECLARATION**

I, Jeffrey C. Barfield of Alpenrosenstrasse 3, 82377 Penzberg, Germany, do hereby declare that I am conversant with the English and German languages and that I am a competent translator thereof.

I verify that the attached English translation is a true and accurate translation of the German language patent application WO 2004/109030 A1 having the international file reference PTC/EP2004/005825 with the application date May 28, 2004.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: November 10, 2005

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Jeffrey C. Barfield

A profile rail and a method of manufacturing a profile rail

The present invention relates to a profile rail for the support of panel-like elements, in particular for the insertion assembly of ceiling panels for grid  
5 ceilings, having a base body which is formed at least regionally as a T section and which includes an elongate web as well as a bottom chord which is arranged along a longitudinal edge of the web and includes two bottom chord sections which each extend substantially in opposite direc-  
10 tions, with the bottom chord being formed by a bent-over portion of the web and the side of the bottom chord disposed remote from the web being provided with a screening strip. The invention furthermore relates to a method of manufacturing such a profile rail.

Profile rails of the initially named kind are used, for example, in the as-  
15 sembly of grid ceilings. For the assembly of grid ceilings, first, a plurality of profile rails are suspended from the ceiling one after the other in the longitudinal direction and at right angles thereto such that a frame construction is provided which has mutually adjoining rectangular regions into which ceiling panels can be inserted. The panels are first obliquely  
20 introduced into the regions between the mutually spaced apart section rails and are subsequently placed onto the inner sides of the bottom chords of the T section rails. The panels are usually additionally secured against lifting upwardly.

25 The frame construction consists of main T section rails which extend in parallel and between which transverse T section rails are arranged which extend perpendicular to the main T section rails. The main sections and the transverse sections usually have identical structures in this process.

Known profile rails are produced, for example, from a strip of sheet metal which is first folded over by  $180^\circ$  along its central longitudinal axis to form the web such that both halves of the strip of sheet metal each contact one another areally. The two free ends of the bent over strip of sheet metal are  
5 each again outwardly folded over by  $90^\circ$  such that they form the two bottom chord sections of the bottom chord of the T section rail produced in this manner.

A top chord, which can be formed, for example, as a hollow section, is  
10 usually provided at the longitudinal edge of the profile opposite the bottom chord. A coupling of fastening elements, via which the profile rails can be suspended from the ceiling, is possible via this top chord.

A screening strip is usually provided at the bottom side of the bottom  
15 chord by which a clean visual downward termination of the profile rail is achieved.

It is problematic with the profile rails of this type that the web is made with double walls, i.e. with double the material thickness, due to the  
20 symmetrical design, which is disadvantageous with respect to the required material effort. Since the required material has a substantial portion of the production costs with profile rails, a reduction of the required material effort is desirable.

25 Furthermore, openings in the web are usually provided at regular intervals in the profile rails of the initially named kind and form a type of desired kink points for the case of fire. Since the profile rails expand by a relatively large amount due to the high heat development in case of fire, the ceiling suspensions would tear relatively quickly due to these longitudinal

expansions without appropriate precautions so that there is a risk that the whole ceiling construction would crash down in case of fire.

Desired kink points are provided by the openings such that, on large  
5 expansions due to high heat development, the profile rails kink at the  
desired kink points due to the forces occurring on the expansion, whereby  
a tearing of the suspensions is prevented.

If the provided top chord is made as a hollow section, corresponding  
10 crimps of the hollow section are usually provided here to produce the  
required desired kink points.

The production of the desired kink points in the form of additional open-  
ings or crimps is associated with additional costs.  
15

It is an object of the present invention to develop a profile rail of the ini-  
tially named kind such that the material effort required for production can  
be reduced.

20 This object is satisfied in accordance with the invention, starting from a  
profile rail of the initially named kind, in that a plurality of apertures is  
formed in the web; in that at least one of the bottom chord sections is  
formed by material sections of the web folded out of the apertures; and in  
that the web is substantially made in one layer over its total area. A  
25 method in accordance with the invention for the manufacture of a profile  
rail for the support of panel-like elements, in particular for the insertion  
assembly of ceiling panels for grid ceilings, is characterized in that an  
elongate strip of material, in particular a strip of metal or of sheet metal,  
is provided with a plurality of elongate incisions, with the two free ends of  
30 the incisions each being arranged on a straight line extending substan-

tially parallel to the longitudinal axis of the strip of material and forming a bending line; and in that the strip of material is bent over along this bending line.

- 5 In accordance with the invention, the material effort for the production of profile rails of the initially named kind is thus clearly reduced by a specific cutting and folding technique. In this manner, the web only has a one-layer design such that the material requirements are thereby clearly reduced in contrast with conventional profile rails. The incisions can in particular be made in U shape, with the strip of material being bent over in a uniform direction along the bending line, whereby the mentioned apertures bounded by the incisions arise. One of the bottom chord sections is formed in this process by a plurality of material sections of the web folded out of the apertures, and the other bottom chord section is substantially formed by a bending over of the web in one piece.

- It is generally also possible for the bending direction to change alternately over part regions of the strip of material such that each of the bottom chord sections is formed over part regions of the strip of material following one another in part from a plurality of material sections folded out of the apertures and in part from a region of the material section which is formed in one piece in each case and which is bent in the opposite direction by the respective bending procedure. For this purpose, incisions or cut-outs can each be provided in the region of the material section to be folded over between the part regions and permit an alternating folding over of the part regions and extend in particular from a longitudinal edge of the material section up to the bending line.

- Since the material originally arranged in the web apertures is not removed in a stamping or cutting procedure, but is used directly for the forming of

at least one of the bottom chord sections, both the bottom chord and the apertures required for the desired kink points can be produced in a single workstep. At the same time, the material of the web folded out of the apertures is not wasted, but used directly for the forming of the bottom  
5 chord, whereby a clear material saving is achieved.

Since the bottom chord section, which is formed in a conventional manner by the direct bent-over portion of the web, is still formed without interruption in the longitudinal direction in the described preferred embodiment  
10 and since a screening strip is provided at the lower side of the bottom chord, sufficient longitudinal stability as well as the same visually perfect downward termination of the profile rail in accordance with the invention is ensured as with conventional profile rails.

15 In accordance with a further advantageous embodiment of the invention, the apertures each have a straight edge extending substantially parallel to a longitudinal edge of the web. It is thereby achieved that the material sections folded out of the apertures have outer edges extending parallel to the web. It is in particular advantageous for the outwardly lying longitudinal  
20 edges of the two bottom chord sections to extend substantially parallel to one another. In this manner, a shape of the profile rails in accordance with the invention corresponding to the usual profile rails is achieved.

The apertures are advantageously substantially made in rectangular or  
25 trapezoidal form. A straight outer edge of the material sections folded out of the apertures is ensured by this shape of the apertures, on the one hand. A design of the bottom chord is possible which is as uniform as possible, on the other hand.

In accordance with a further preferred embodiment of the invention, the two bottom chord sections have substantially the same width. It is thereby ensured that the contact surfaces for the ceiling panels each have substantially the same width or depth at both sides of the web.

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The bottom chord and the web preferably stand substantially perpendicular to one another such that an optimum T section is formed.

10 In accordance with a further advantageous embodiment of the invention, the radius of the bent-over portion is smaller than 3 mm, in particular smaller than 2 mm, preferably smaller than 1 mm. The sharper the edge of the bent-over portion is formed, the higher the waviness in the region of the bottom chord and thus in the region of the screening strip so that a light bending radius is preferred. The bending radius may not, however,  
15 be too large, since the contact surface for the ceiling panels would otherwise be too small. The bending can take place, for example, by profile rolling or edges.

20 The base body is preferably produced from a uniform strip of material, in particular from a strip of metal or from a strip of sheet metal. In this manner, no individual parts have to be connected to one another such that an additional processing step can be omitted. The web and/or the bottom chord are made substantially flat in this process in order, on the one hand, to ensure a good contact surface for the panels and, on the  
25 other hand, a good stackability for storing.

The thickness of the web and/or of the bottom chord can amount to approximately between 0.1 and 0.5 mm, preferably between 0.2 and 1 mm, in particular approximately between 0.3 and 0.8 mm. An optimum com-

promise between required stiffness and costs is achieved with these dimensions.

5 In accordance with a further preferred embodiment, the screening strip is rolled onto the bottom chord. Generally, any other attachment, for example an adhesive bonding, is also feasible. The visible surface of the screening strip is preferably coated to thus produce an appealing finish. The outwardly lying longitudinal edges of the bottom chord are furthermore preferably encompassed by the screening strip, whereby a clean lateral  
10 termination of the bottom chord is produced, on the one hand, and the stability of the T section rail is further increased, on the other hand.

In accordance with a further advantageous embodiment of the invention, a top chord is provided at the longitudinal edge of the web disposed opposite  
15 the bottom chord. This top chord can be made in a known manner, for example, as a hollow section. The top chord can, however, also be made in any other manner, for example also similar or identical to the bottom chord by a fold in accordance with the invention, for example in accordance with claim 26.

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The stiffness of the profile can be increased by a top chord, on the one hand, and the top chord can be made for the coupling of fastening elements, in particular of suspension elements, to the profile rail, on the other hand. It is generally also possible for additional fastening apertures  
25 to be formed in the web for fastening elements, in particular for suspension elements. Whereas the fastening elements can be attached substantially continuously over the total length of the profile rail by an appropriately made top chord, only an attachment of the fastening elements at discrete intervals is possible in the case of fastening apertures. If addi-  
30 tional fastening apertures are provided within the web, the fastening



elements can, for example, be made in a cost-favorable manner as suspension wires.

5 The top chord can advantageously include a longitudinal edge which is connected to the web, in particular to the upper edge of the web. The stability of the profile rail is increased by this connection which can in particular extend over the total length or over a partial region of the web. The connection can preferably take place in this process by stitching or by another suitable process such as riveting or adhesive bonding. One or  
10 more stitching seams can be provided in this process. The seams can furthermore extend parallel to one another and/or to the longitudinal extent of the web or obliquely thereto in regions, for example in the form of a zig-zag pattern or of a herringbone pattern. Even if the longitudinal edge of the top chord overlaps the web regionally along the connection surface,  
15 the web itself is still made substantially in one layer over its whole area since the overlapping area of the top chord does not form part of the web in the sense of this application.

20 The apertures preferably have substantially the same width in the longitudinal direction of the web. The width of the apertures in the longitudinal direction of the web is in particular substantially the same as the width of the material sections of the web disposed in the longitudinal direction of the web between the apertures. An optimized load absorption of the profile rail is thereby achieved.

25 In accordance with a further advantageous embodiment of the invention, reinforcement elements, in particular reinforcement beads, are provided in and/or at the web material. The reinforcement elements in this process are preferably made in and/or at the material sections of the web disposed  
30 between the apertures. The stability of a profile rail formed in accordance

with the invention is increased by the reinforcement elements. At least two reinforcement elements are each advantageously formed in and/or at at least some of the material sections disposed between two openings and extend outwardly in opposite directions, starting from the material section. For instance, reinforcement beads can be provided, for example, of which one or more are produced by embossing into the one side of the web material and of which one or more further ones can be produced by embossing into the other side of the web material.

- 10 In accordance with the method in accordance with the invention for the manufacture of a profile rail made in accordance with the invention, an elongate strip of material, in particular a strip of metal or a strip of a sheet metal, is provided with a plurality of elongate incisions, with the two free ends of the incisions each being arranged on a straight line extending
- 15 substantially parallel to the longitudinal axis of the strip of material and forming a bending line and with the strip of material being bent over along this bending line.

- The material sections of the web bordered by the incision lines fold out of the web due to the bending procedure and thus form one half of the bottom chord of the profile rail (called the bottom chord section in the following), with this bottom chord section consisting of a plurality of material sections spaced apart from one another in the longitudinal direction.
- 20

- 25 The part of the web simultaneously bent in the opposite direction by the bending procedure forms the second bottom chord section which is made in one piece over its total length. Generally, as described further above, the two bottom chord sections can also be formed over part regions of the material section in each case alternately by the folded out material sections or by the oppositely disposed bent over part of the material section.
- 30

The web and the bottom chord are thus made in their final shape in one single bending procedure and thus in one single workstep by the method in accordance with the invention. At the same time, apertures are made in  
5 the web which serve as desired kink points for the case of fire.

The strip of material is preferably bent over by approximately 90° in order to produce a T section in this manner.

10 The incisions can be produced by a rotational cutting method or by a laser cutting method, by a stamping procedure or also by any other suitable method.

In accordance with an advantageous embodiment of the invention, the  
15 incisions are made in U shape, in particular with a straight-line base and straight limbs preferably extending perpendicular thereto, or in trapezoidal form. The height of the incisions, i.e. in each case the perpendicular spacing from the bending line to the point of the respective incision disposed furthest away, are preferably substantially of the same size. It is  
20 thereby ensured that all material sections folded out have the same height and that thus the bottom chord section formed from these material sections has a uniform width, with the exception of the material-free regions disposed between the material sections.

25 The height of the incisions is furthermore preferably substantially the same as the spacing between the bending line and the longitudinal edge of the strip of material such that the two bottom chord sections forming the bottom chord are arranged substantially equally wide and symmetrically with respect to the web.

Further advantageous embodiments of the invention are recited in the dependent claims.

The invention will be described in more detail in the following with refer-  
5      ence to embodiments and to the drawings; there are shown in these:

Fig. 1 a perspective view of a frame construction with T section rails in accordance with the prior art to form a grid ceiling;

10     Fig. 2     a plan view of a strip of sheet metal with incision lines formed  
in accordance with the invention;

Fig. 3 a perspective view of a profile rail formed in accordance with the invention in accordance with an intermediate step of the production method;

Fig. 4 a cross-section through the profile rail in accordance with Fig. 3;

20    Fig. 5.    the view of Fig. 4 with an additional screening strip;

Fig. 6 the view of Fig. 3 with an associated screening strip,

Figs. 7 - 9 further embodiments of the invention in cross-section;

Fig. 10 a cross-section through a profile rail in accordance with Fig. 1;

Fig. 11 a further embodiment of the invention in cross-section; and

Fig. 12 a perspective representation of the profile rail of Fig. 7.

Fig. 1 shows a frame construction 1 which consists of a plurality of profile rails 2 extending parallel and perpendicular thereto.

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The profile rails 2 have a T-shaped cross-section with an elongate web 3 and a bottom chord 4 adjoining its lower longitudinal edge. The bottom chord 4 consists of two bends of the web 3, outwardly in each case, by which two bottom chord sections 5, 6 are formed which form contact

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The profile rails 2 have a top chord 8 at their upper longitudinal side which is made as a hollow section and serves for the coupling of the profile rails 2 to suspension elements 9, 10.

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It can be seen from the cross-section of Fig. 10 through one of the profile rails 2 that the profile rail 2 has a symmetrical design. It is disadvantageous that the web 3 is made in double layers, whereby a high material consumption is given.

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Fig. 2 shows a plan view of a strip of sheet metal 11 such as forms the starting point for the production of a profile rail formed in accordance with the invention.

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A plurality of elongate incisions 12 made in U shape are provided in the strip of sheet metal 11 and each consist of three straight-line part incisions 13, 14, 15 which stand perpendicular to one another. The part sections 14 extend parallel to one of the longitudinal edges 16 of the strip of sheet metal 11.

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The free ends 17, 18 of the incisions 12 each lie on a straight line extending parallel to the longitudinal axis 19 of the strip of sheet metal 11 and forming a bending line 20.

- 5 The height 21 of the incisions 12 are substantially of equal size and are substantially equal to the spacing 22 between the bending line 20 and the longitudinal edge 16 of the strip of sheet metal 11. The U-shaped incisions 12 are furthermore substantially equally wide and each have the same width as the material sections 36 disposed between the incisions 12.

10

- To form the profile rail made in accordance with the invention, the strip of sheet metal 11 is folded over along the bending line 20 such that the material sections 23 of the strip of sheet metal 11 bordered by the incisions 12 are folded out of the drawing plane and the strip-shaped section 15 24 arranged between the bending line 20 and the longitudinal edge 16 is folded into the drawing plane such that the base body 25 of the profile rail shown in Fig. 3 arises.

- As can be seen from Fig. 3, the strip-shaped section 24 and the material 20 sections 23 form bottom chord sections 26, 27 of a bottom chord 28 after the folding procedure, whereas the remaining region of the strip of sheet metal 11, which is substantially perpendicular to the bottom chord 28, forms a web 29 of the base body 25. The bending line 20 in this process forms the lower longitudinal edge of the web 29 which the bottom chord 25 28 adjoins.

Apertures 30, which are substantially rectangular, are created in the web 29 by the folding out of the material sections 23.

Furthermore, additional fastening apertures 31 are provided in the web 29 in Fig. 3 in the form of bores which repeat at regular intervals. In addition, two reinforcement beads 37 each are formed between the apertures 30 in the material sections 36 and are made by embossings in the surface of the web 29 extending in opposite directions such that the one reinforcement bead projects out of the drawing plane and the other projects into it. Whereas reinforcement beads 37 are only shown in one material section 36 in Fig. 3, they can also be formed in the other material sections 36 or in another region of the web 29 and/or of the bottom chord 28.

To avoid waviness of the bottom chord 28 arising in the folding procedure as much as possible, a low bending radius  $r$  is observed along the bending line 20 which can in particular be recognized from the cross-section of Fig. 4.

For the complete production of a profile rail made in accordance with the invention, the lower side of the bottom chord 28 is provided with a screening strip 32 such as can be recognized from Figs. 5 and 6.

The screening strip 32 is usually coated at least at the lower side and engages around the outwardly disposed longitudinal edges 16, 33 of the bottom chord 20 such that an additional stabilization of the bottom chord 28 is achieved.

The apertures 30 simultaneously serve as desired kink points for the profile rail formed in accordance with the invention, for example in case of fire. If, in case of fire, a high longitudinal expansion of the profile rails takes place due to the great heat, the profile rails kink due to the material weaknesses due to the apertures 30 before, due to the longitudinal expansion, the fastening elements at which the profile rail is suspended from

the ceiling tear, such that a crashing down of the total ceiling construction is prevented.

5 Fastening elements for suspension from a ceiling can be hung into the fastening apertures 31, for example, in the embodiment in accordance with Fig. 6. The fastening elements can be made, for example, as simple fastening wires having a U-shaped end.

10 It is generally also possible for the fastening of a profile rail made in accordance with the invention to take place by a top chord 35 formed at the upper edge 34 of the base body 25. The top chord 35 can be made in corresponding manner to the top chord 8 of the prior art shown in Fig. 1 or in another manner, such as shown in Figs. 7 to 9 or 11. In accordance with Fig. 11, the top chord, like the bottom chord, is made in a manner in  
15 accordance with the invention, e.g. corresponding to claims 19 or 24. Since the top chord has no throughgoing top chord sections in this case, it can optionally be provided with indentations which cooperate with suspension elements and thus prevent a displacement of the suspension elements in the longitudinal direction of the profile rail.

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Furthermore, the top chord 35, as shown in Fig. 12, can have a longitudinal edge 38 which is connected via stitching seams 40 to the longitudinal edge 34 of the web 29. The stitching seams 40 can form different patterns such as are shown by way of example in Fig. 12. In contrast to Fig. 12,  
25 only one stitching seam or a plurality of such stitching seams can also be provided. Such a connection or any other suitable connection can also be provided with the other top chords shown in Figs. 8, 9 and 11 or in other realizations of top chords to increase the stiffness of a profile rail in accordance with the invention.



Reference numeral list

	1	frame construction
	2	profile rail
5	3	web
	4	bottom chord
	5	bottom chord section
	6	bottom chord section
	7	panel-like elements
10	8	top chord
	9	suspension elements
	10	suspension elements
	11	strip of sheet metal
	12	incisions
15	13	part incisions
	14	part incisions
	15	part incisions
	16	elongate edge
	17	free end of the incisions 12
20	18	free end of the incisions 12
	19	longitudinal axis
	20	bending line
	21	height
	22	spacing
25	23	material section
	24	strip-shaped section
	25	base body
	26	bottom chord section
	27	bottom chord section
30	28	bottom chord

	29	web
	30	apertures
	31	fastening apertures
	32	screening strip
5	33	elongate edge
	34	elongate edge
	35	top chord
	36	material sections
	37	reinforcement beads
10	38	longitudinal edge of the top chord
	40	stitching seams

**Claims**

1. A profile rail for the support of panel-like elements (7), in particular for the insertion assembly of ceiling panels for grid ceilings, having a  
5 base body (25) which is formed at least regionally as a T section and which includes an elongate web (29) as well as a bottom chord (28) which is arranged along a longitudinal edge (20) of the web (29) and includes two bottom chord sections (26, 27) which each extend from  
10 the web (29) substantially in opposite directions, with the bottom chord (28) being formed by a bent-over portion of the web (29) and the side of the bottom chord (28) disposed remote from the web being provided with a screening strip (32),  
characterized in that  
a plurality of apertures (30) is formed in the web (29); in that at least  
15 one of the bottom chord sections (26) is formed by material sections (23) of the web (29) folded out of the apertures (30); and in that the web (29) is essentially made in one layer over its total area.
2. A profile rail in accordance with claim 1, characterized in that one of  
20 the bottom chord sections (26) is formed by a plurality of material sections (23) of the web (29) folded out of the apertures (30) and the other bottom chord section (26) is substantially formed by a one-piece bent-over portion of the web (29).
- 25 3. A profile rail in accordance with claim 1, characterized in that both bottom chord sections are respectively alternately formed regionally by material sections of the web folded out of the apertures and by one-piece bent-over portions of the web adjoining them, with each part region of the one bottom chord section formed as a one-  
30 piece bent-over section lying opposite to a part region of the other

bottom chord section formed by material sections folded out of the apertures.

4. A profile rail in accordance with one of claims 1 to 3, characterized  
5 in that the apertures (30) each have a straight edge (14) extending substantially parallel to a longitudinal edge (16) of the web (29).
5. A profile rail in accordance with one of the preceding claims, characterized  
10 in that the apertures (30) are substantially made in rectangular or trapezoidal form.
6. A profile rail in accordance with one of the preceding claims, characterized  
15 in that the outwardly lying longitudinal edges (16, 33) of the two bottom chord sections (26, 27) extend substantially parallel to one another.
7. A profile rail in accordance with one of the preceding claims, characterized  
20 in that the two bottom chord sections (26, 27) have substantially the same width.
8. A profile rail in accordance with one of the preceding claims, characterized  
in that the bottom chord (28) and the web (29) are substantially perpendicular to one another.
- 25 9. A profile rail in accordance with one of the preceding claims, characterized in that the radius (r) of the bent-over portion is smaller than 3 mm, in particular smaller than 2 mm, preferably smaller than 1 mm.

10. A profile rail in accordance with one of the preceding claims, characterized in that the base body (25) is produced from a uniform strip of material, in particular from a strip of metal or from a strip of sheet metal (11).

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11. A profile rail in accordance with one of the preceding claims, characterized in that the web (29) is substantially flat.

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12. A profile rail in accordance with one of the preceding claims, characterized in that the thickness of the web (29) and/or of the bottom chord (28) amounts to approximately between 0.1 and 1.5 mm, preferably approximately between 0.2 and 1 mm, in particular approximately between 0.3 and 0.8 mm.

15

13. A profile rail in accordance with one of the preceding claims, characterized in that the screening strip (32) is rolled onto the bottom chord (28) or is adhesively bonded to it and/or is laminated at its visible surface and/or engages around the outwardly disposed longitudinal edges (16, 33) of the bottom chord (28).

20

14. A profile rail in accordance with one of the preceding claims, characterized in that a top chord (35) is provided at the longitudinal edge (34) of the web disposed opposite the bottom chord (28).

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15. A profile rail in accordance with claim 14, characterized in that the top chord (35) is made for the coupling of fastening elements (9, 10), in particular of suspension elements, to the profile rail.

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16. A profile rail in accordance with claim 14 or claim 15, characterized in that the top chord (35) is made as a hollow section.

17. A profile rail in accordance with claim 14 or claim 15, characterized in that the top chord (35) is made in corresponding manner to the bottom chord (28).

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18. A profile rail in accordance with one of claims 14 to 17, characterized in that the top chord (35) includes a longitudinal edge (38) which is connected to the web (29), in particular to the longitudinal edge (34) of the web (29).

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19. A profile rail in accordance with claim 18, characterized in that the longitudinal edge (38) of the top chord (35) is connected to the web (29) by stitching.

15 20. A profile rail in accordance with one of the preceding claims, characterized in that additional fastening apertures (31) are formed in the web (29) for fastening elements, in particular for suspension elements.

20 21. A profile rail in accordance with one of the preceding claims, characterized in that the apertures (30) have substantially the same width in the longitudinal direction of the web (29).

25 22. A profile rail in accordance with one of the preceding claims, characterized in that the width of the apertures (30) in the longitudinal direction of the web (29) is substantially the same as the width of the material sections (36) of the web (29) disposed in the longitudinal direction of the web (29) between the apertures (30).

23. A profile rail in accordance with one of the preceding claims, characterized in that reinforcement elements (37), in particular reinforcement beads, are made in and/or at the web material.
- 5 24. A profile rail in accordance with claim 23, characterized in that the reinforcement elements (37) are made in and/or at the material sections (36) of the web (29) disposed between the apertures (30).
- 10 25. A profile rail in accordance with claim 23 or claim 24, characterized in that at least two reinforcement elements (37) are each formed in and/or at at least some of the material sections (36) disposed between two apertures (30) and extend outwardly in opposite directions, starting from the material section (36).
- 15 26. A method for the manufacture of a profile rail for the support of panel-like elements (7), in particular for the insertion assembly of ceiling panels for grid ceilings, characterized in that
- 20 an elongate strip of material (11), in particular a strip of metal or a strip of sheet metal, is provided with a plurality of elongate incisions (12), with the two free ends (17, 18) of the incisions (12) each being arranged on a straight line extending substantially parallel to the longitudinal axis (19) of the strip of material (1) and forming a bending line (20); and in that the strip of material (11) is bent over along
- 25 this bending line (20).
27. A method in accordance with claim 26, characterized in that the incisions (12) are made in U shape, in particular with a straight-line base (14) and straight limbs (13, 15) preferably extending perpendicular thereto, or in trapezoidal form.
- 30

28. A method in accordance with one of claims 26 or 27, characterized in that the height (21) of the incisions (12), i.e. in each case the perpendicular spacing from the bending line (20) to the point of the respective incision (12) disposed furthest away, is substantially of the same size.
29. A method in accordance with one of claims 26 to 28, characterized in that the height (21) of the incisions (12), i.e. in each case the perpendicular spacing from the bending line (20) to the point of the respective incision (12) disposed furthest away, is substantially the same as the spacing (32) between the bending line (20) and the longitudinal edge (16) of the strip of material.
30. A method in accordance with one of claims 26 to 29, characterized in that the incisions (12) are each produced on the same side of the bending line (20).
31. A method in accordance with one of the claims 26 to 30, characterized in that the strip of material (11) is bent over by approximately 90°.
32. A method in accordance with one of claims 26 to 31, characterized in that the incisions (12) are produced by a rotation cutting method or by a laser cutting method or by a stamping procedure.



**AMENDED CLAIMS**

[received at the International office on 3 November 2004 (03.11.04),  
original claim 26 changed

- 5    23.    A profile rail in accordance with one of the preceding claims, characterized in that reinforcement elements (37), in particular reinforcement beads, are made in and/or at the web material.
- 10    24.    A profile rail in accordance with claim 23, characterized in that the reinforcement elements (37) are made in and/or at the material sections (36) of the web (29) disposed between the apertures (30).
- 15    25.    A profile rail in accordance with claim 23 or claim 24, characterized in that at least two reinforcement elements (37) are each formed in and/or at at least some of the material sections (36) disposed between two apertures (30) and extend outwardly in opposite directions, starting from the material section (36).
- 20    26.    A method for the manufacture of a profile rail in accordance with any one of the claims 1 to 25 for the support of panel-like elements (7), in particular for the insertion assembly of ceiling panels for grid ceilings,  
characterized in that  
an elongate strip of material (11), in particular a strip of metal or a  
25    strip of sheet metal, is provided with a plurality of elongate incisions (12), with the two free ends (17, 18) of the incisions (12) each being arranged on a straight line extending substantially parallel to the longitudinal axis (19) of the strip of material (1) and forming a bending line (20); and in that the strip of material (11) is bent over along  
30    this bending line (20).